UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/687,009	10/12/2000	John Harper	CISCP542	1375

26541	7590	09/14/2004

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EXAMINER
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ART UNIT	PAPER NUMBER
2661	

DATE MAILED: 09/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/687,009	HARPER, JOHN
	Examiner	Art Unit	
	Ian N Moore	2661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on _____ .
2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1-34_ is/are pending in the application.
  4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) _1-30 and 32-34_ is/are rejected.
7) ☒ Claim(s) _31_ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
  Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
  Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  a) ☐ All b) ☐ Some * c) ☐ None of:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
    3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
      application from the International Bureau (PCT Rule 17.2(a)).
  * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
  Paper No(s)/Mail Date _____ .
4) ☐ Interview Summary (PTO-413)
  Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____ .

DETAILED ACTION

Response to Amendment

1. Independent claims 1, 15,19 and 20 are amended.

2. New claims 22-34 are added.

3. Claims 1-12, 29-33, 15-17, 19, 20-21, and 22-28 are rejected by the new ground(s) of
    rejection necessitated by the amendment.

4. Claims 13,14,18 and 34 are rejected by the same ground of rejections.

Response to Arguments

5. Applicant's arguments filed 6-14-2004 have been fully considered but they are not
    persuasive.

    Regarding claims 13, 14, and 18, the applicant argued that, "...Soloway'092 does
    not anticipate... incremental Dijkstra's algorithm applied to the root node only if new route
    information improves or worsens at least one of the existing routes or at least one of the
    existing routes is lost..." in paragraph 6, page 10.

    In response to applicant's argument, the examiner respectfully disagrees that
    Soloway'092 does not anticipate... incremental Dijkstra's algorithm applied to the root node
    only if new route information improves or worsens at least one of the existing routes or at
    least one of the existing routes is lost. As recited in the first office action, Soloway'092
    discloses applying an incremental Dijkstra's algorithm to the root node **(see col. 7, line 60 to
    col. 8, line 33; and see col. 20, line 31-61; note that routing and forwarding logics in
    each switch utilizes Dijkstra's algorithm shortest path calculation to compute/construct**

each route/link for the forwarding table. When applying Dijkstra's algorithm for shortest paths, the algorithm must utilize the differences/increments/deltas between existing routes and newly affected routes.) only if said new route information improves or worsens at least one of the existing routes or at least one of the existing routes is lost (**see col. 3, line 13-24 and col. 4, line 19-65; note that the LSP packet with the newly affected link/route information is received due to the network topology changes (i.e. a link is failed/lost, a set of operational channels on the link changes, or a new switch is deployed). The routing/forwarding Logic recalculates/updates the routes in the forwarding table in accordance with the newly affected links/routes to recover/improve/advance the current/existing links routing.**)

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., **...algorithm...is particularly advantageous in that the number of nodes to be examined is reduced so that computation required is only a fraction of the conventional implementation**) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Note that Soloway'092 Dijkstra's algorithm for calculating the shortest paths uses the incremental/differences/delta between the existing routes and newly affected routes. The algorithm must be applied in the incremental or sequential order in order to identified differences or increments or deltas. One cannot determine the shortest path without determining or comparing the path attributes between the pluralities of paths. Thus, it is clear

that Soloway'092 Dijkstra's algorithm for calculating the shortest paths between existing

routes and newly affects routes are incremental Dijkstra's algorithm. Moreover, application

neither explicitly discloses nor specifics any unique/specific functionality of "incremental"

when utilizing in Dijkstra's algorithm. Since there is no specific functionality of

"incremental" is being claimed, examiner asserted, the incremental Dijkstra's algorithm that

the algorithm that performs in incremental order which results in determining the increments

for the shortest path. Moreover, any algorithm, method or procedure is "incremental" in order

to process plurality of data via the step(s) in a method/algorithm.

Claim Objections

6. Claim 11 objected to because of the following informalities: "the method of claim **11**…" in

line 10. Since claim 11 cannot depend on itself, the examiner asserts that dependent claim 11

depends on independent claim 1.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 13, 18, 30, and 34 are rejected under 35 U.S.C. 102(e) as being anticipated by

Soloway'092.

Regarding claims 13, 18 and 30, Soloway'092 discloses a computer program

product (see FIG. 8 and 9, Flow chart for processing LSP packets and computing a forward

table) to execute a method/code of updating a tree structure of a root node (see FIG. 2 and 3;

Forwarding Table of a switch) in a computer network of interconnected nodes (see FIG. 1,

Data Packet Switching system; note that each switch in the data network performs

computing/processing; thus it is a computer network.) after a change in the network's

topology (see col. 3, line 1-20) and the method/code comprising the step of:

receiving new route information at the root node (see FIG. 2; col. 3, line 13-24; col. 4,

line 1-59; note that when there is a change in the network, the LSP packet is received at the

switch with newly affected link/route information); and

applying an incremental Dijkstra's algorithm to the root node (see col. 7, line 60 to

col. 8, line 33; and see col. 20, line 31-61; note that routing and forwarding logics in each

switch utilizes Dijkstra's algorithm shortest path calculation to compute/construct each

route/link for the forwarding table. When applying Dijkstra's algorithm for shortest paths, the

algorithm must utilize the differences/increments/deltas between existing routes and newly

affected routes.) only if said new route information improves or worsens at least one of the

existing routes or at least one of the existing routes is lost (see col. 3, line 13-24 and col. 4,

line 19-65; note that the LSP packet with the newly affected link/route information is

received due to the network topology changes (i.e. a link is failed/lost, a set of operational

channels on the link changes, or a new switch is deployed). The routing/forwarding Logic

recalculates/updates the routes in the forwarding table in accordance with the newly affected

links/routes to recover/improve/advance the current/existing links routing.)

Regarding Claim 34, Soloway'092 discloses wherein the number of nodes examined (see FIG. 1, switches 4a-d or endnodes 10a-e) is proportional to the log of the number of nodes within the network (see FIG. 2, Destination nodes in 1st column, where the switches 4 and endnode 10 are proportional; see col. 8, lines 21-60; note that the number of nodes that transmits and processes the LSP (i.e. switches 4a-d or endnodes 10a-e) is also listed in each forwarding table (i.e. the log). Thus, the number of nodes within the network which transmits/evaluates/examines LSP and the number of nodes within the log in the forwarding table are proportional.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1-4,6,8-12,15,16,19,20,22,25,32 and 33 rejected under 35 U.S.C. 103(a) as being unpatentable over Soloway (U.S. 5,265,092) in view of Elliott (U.S. 6,456,599).

Regarding Claims 1, 15, 19, and 20, Soloway'092 discloses a system (see FIG. 4, a switch 4) for performing route calculations in a link state routing protocol (see col. 3, line 1-8; the system utilizes LSP routing protocol) at a node (see FIG. 1, Switch 4) in a computer network of interconnected nodes (see FIG. 1, Data Packet Switching system; note that each

switch in the data network performs computing/processing; thus it is a computer network.)

after a change in the network's topology (see col. 3, line 1-20) comprising:

a processor (see FIG. 4, a combined system of Routing Logic 38 and Forwarding

Process Logic 40) operable to evaluate existing routes of the node when new route

information is received (see FIG. 2; col. 3, line 13-24; col. 4, line 1-59; note that when there

is a change in the network, the LSP packet is received at the switch with newly affected

link/route information. The routing logic, according to the LSP routing protocol, permits

each switch to determine/evaluate the current/existing routes in the forwarding table), and

recalculate routes and modify a routing table (see FIG. 4, Forwarding table 36) for

said node only when said new route information improves existing routes or existing routes

are made worse or lost (see col. 3, line 13-24 and col. 4, line 19-65; note that the LSP packet

with the newly affected link/route information is received due to the network topology

changes (i.e. a link is failed, a set of operational channels on the link changes, or a new

switch is deployed). The routing/forwarding Logic recalculates and modifies/updates the

routes in the forwarding table in accordance with the newly affected links/routes to

recover/improve/advance the current/existing links routing.)

and memory (see FIG. 4, the combined system of LSP Database 34 and Forwarding

Table 36) for storing route information (see col. 9, line 56 to col. 10, line 14).

Soloway'092 does not explicitly disclose determining if new route information

improves at least one of the existing routes or at least one of existing routes is made worse or

lost.

However, the above-mentioned claimed limitations are taught by Elliott'599. In particular, Elliott'599 teaches determining if new route information improves at least one of the existing routes or at least one of existing routes is made worse or lost (see FIG. 4, steps S5-S7; the step S6 and S7 determines whether the routing message which includes the new link from the potential neighbor optimizes/aligns and improves the existing path/link from the actual neighbor (step S8) or not (Step S10). Note that "not optimizing/aligning/improving" means, the existing link from the actual neighbor is made worse; see col. 9, lines 44 to col. 10, lines 2).

In view of this, having the system of Soloway'092 and then given the teaching of Elliott'599, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Soloway'092, by providing a mechanism to optimally select improved/better actual links/routes from potential/new links/routes, as taught by Elliott'599. The motivation to combine is to obtain the advantages/benefits taught by Elliott'599 since Elliott'599 states at col. 1, line 40-64 that such modification would provide optimally selection between the existing link from the actual neighbor and the new link from potential neighbor node in the routing table/list, and it would decrease the number of control traffic, reduce the cost/bandwidth in the network, and increase the network utilization.

Regarding Claim 22, Soloway'092 discloses a method for performing route calculations in a link state routing protocol (see col. 3, line 1-8; the system utilizes LSP routing protocol) at a root node (see FIG. 5, Originator ID, Sender, Adjacency information,

in the LSP packet; see col. 10, line 57 to col. 11, line 50; note that a root node is the

originator of LSP packet) within a computer network, the method comprising:

receiving new route information at the root node (see FIG. 2; col. 3, line 13-24; col. 4,

line 1-59; note that when there is a change in the network, the LSP packet is received at the

switch with newly affected link/route information);

evaluating changes in state and evaluating routes (see FIG. 4, a combined system of

Routing Logic 38 and Forwarding Process Logic 40; col. 3, line 13-24; col. 4, line 1-59; The

combined logic, according to the LSP routing protocol, permits each switch to

determine/evaluate the changing states in current/existing routes in the forwarding table),

reattaching routes in a spanning tree (see FIG. 2, a routing table of switch 4a consists

the Hold-down bit for channel 8a of switch 4d; FIG. 9 step 74-78; col. 3, line 15-41; col. 8,

line 12-61; col. 6, line 34-69; note that when LSP/ILSP indicates the affected link, the switch

4a enters the switch (i.e. switch 4d) associated with the affected links (i.e. hold-down bit

entry) in the forwarding table/tree. Then, the switch (i.e. Switch 4a) re-computes/re-

calculates/reattaches the switches associated with the remaining non-affected links/switches

in the forwarding table. Note that a spanning tree is the forwarding table, which is build

according to Dijkstra's algorithm.) and re-evaluating routes from reattached nodes (see FIG.

2, List of forwarding channels, hold down bit channel 8a; see col. 8, line 12-60; note that the

switch determines/re-evaluates the forwarding table by changing each destination node entry

(i.e. hold down bit on that particular channel of the affected links/routes) after receiving a

link change LSP due to a failure.) Moreover, in case of a link failure, the routes/links to the

source/root node, stored in the forwarding table, are no longer operational; the

routing/forwarding logic must re-evaluate and re-compute the existing routes in accordance with the affected links/routes. In the process of recovering/improving the routing, first the logic must cancel the links/routes associated with the affected switches. Then after, the routing logic must re-evaluate and re-compute all routes/links associated with the immediate switches/nodes in the forwarding table.

Soloway'092 does not explicitly disclose sorting nodes with new route information into order of cost; evaluating if existing routes are improved, lost or made worse; reattaching routes at lowest cost point.

However, the above-mentioned claimed limitations are taught by Elliott'599. In particular, Elliott'599 teaches sorting nodes (see FIG. 4, step S6, perform optimization evaluation) with new route information into order of cost (see col. 9, lines 44-50; the actual and neighbor nodes are optimized/sorted in accordance with the new route message and lowest-cost for routing messages. Thus, the nodes are optimized/sorted into order of cost);

evaluating routes if existing routes are improved, lost or made worse (see FIG. 4, steps S5-S7; the step S6 and S7 determines whether the routing message which includes the new link from the potential neighbor optimizes/aligns and improves the existing path/link from the actual neighbor (step S8) or not (Step S10). Note that "not optimizing/aligning/improving" means, the existing link from the actual neighbor is made worse; see col. 9, lines 44 to col. 10, lines 2;

reattaching routes at lowest cost point (see col. 9, lines 44-67; the link/path from the node with the less expensive or lowest-cost is selected and incorporated into network topology in the routing table).

In view of this, having the system of Soloway'092 and then given the teaching of Elliott'599, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Soloway'092, by providing a mechanism to optimally select improved/better actual links/routes from potential/new links/routes, sorts/selects/reattaches routes according to the lowest-cost, as taught by Elliott'599. The motivation to combine is to obtain the advantages/benefits taught by Elliott'599 since Elliott'599 states at col. 1, line 40-64 that such modification would provide optimally selection between the existing link from the actual neighbor and the new link from potential neighbor node in the routing table/list, and it would decrease the number of control traffic, reduce the cost/bandwidth in the network, and increase the network utilization.

Regarding claim 2, Soloway'092 discloses receiving a link state packet (see FIG. 5, LSP packet) with information about the node's path to a root node (see FIG. 5, Originator ID, Sender, Adjacency information, in the LSP packet; see col. 10, line 57 to col. 11, line 50; note that a root node is the originator of LSP packet.) and wherein the node's route to the root node is improved (see col. 3, line 13-24 and col. 4, line 19-65; note that the LSP packet with the newly affected link/route information is received due to the network topology changes (i.e. adding a new node/switch in the network). The routing/forwarding Logic recalculates/updates the routes in the forwarding table in accordance with the newly affected links/routes to improve/advance the current/existing links routing.

Elliott'599 teaches wherein the node's route to the root node is improved and further comprising evaluating the node's neighbor nodes (see FIG. 5 and FIG. 9, Steps S31-S42; see

col. 9, line 26 to col. 11, line 20; note that a node receives cluster beacons (i.e. link-state updates) message from the neighbors. The node determines/evaluates whether the sender node in the beacon message is already in the routing table. If the sender node is already the actual neighbor, the node stores the sender node ID into actual neighbor table (i.e. the table that stores existing routes/nodes). However, if the sender node ID in the message is not currently in the routing table (i.e. the sender node is newly added route/node), then the newly added sender node ID is added to the potential neighbor table (i.e. the table that stores newly added route/node). Then after, the actual routes and potential/new routes are compared, and the potential/new routes are added to the actual neighbor table if new/potential routes are better/improved routes than actual/current/existing routes).

In view of this, having the system of Soloway'092 and then given the teaching of Elliott'599, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Soloway'092, by providing a mechanism to optimally select improved/better actual links/routes from potential/new links/routes, as taught by Elliott'599. The motivation to combine is to obtain the advantages/benefits taught by Elliott'599 since Elliott'599 states at col. 1, line 40-64 that such modification would provide optimally selection the to actual neighbor from potential neighbor node in the routing table/list, and it would decrease the number of control traffic, reduce the cost/bandwidth in the network, and increase the network utilization.

Regarding Claim 3, Soloway'092 discloses receiving a link state packet (see FIG. 5, LSP packet) with information about the node's path to a root node (see FIG. 5, Originator ID,

Sender, Adjacency information, in the LSP packet; see col. 10, line 57 to col. 11, line 50;

note that a root node is the originator of LSP packet.) and wherein the node's route to the root

node has worsened (see col. 3, line 13-24 and col. 4, line 19-65; note that the LSP packet

with the newly affected link/route information is received due to the network topology

changes (i.e. a link is failed, or a set of un-operational channels on the link) and further

comprising evaluating the node's path to the root node (see FIG. 2, List of forwarding

channels, hold down bit channel 8a; see col. 8, line 12-60; note that the switch

determines/evaluates the forwarding table by changing each potential destination node entry

(i.e. hold down bit on that particular channel of the affected links/routes). Also, note that the

destination node entries in the forwarding table include the neighbors' switches/nodes.)

Regarding claims 4 and 27, Soloway'092 discloses wherein nodes contained within

a subtree containing the node (see FIG. 2, the intermediate switches 4 between end nodes 10;

note that the forwarding table in each node/switch contains the intermediate/subtree switches

(i.e. neighbor switches)) are scrapped, and the routes to all nodes in the subtree are

reevaluated (see FIG. 2, List of forwarding channels, hold down bit channel 8a; see col. 8,

line 12-60; note that the switch determines/re-evaluates the forwarding table by changing

each destination node entry (i.e. hold down bit on that particular channel of the affected

links/routes) after receiving a link change LSP due to a failure.) Moreover, in case of a link

failure, the routes/links to the source/root node, stored in the forwarding table, are no longer

operational; the routing/forwarding logic must re-evaluate and re-compute the existing routes

in accordance with the affected links/routes. In the process of recovering/improving the

routing, first the logic must cancel the links/routes associated with the affected switches.
Then after, the routing logic must re-evaluate and re-compute all routes/links associated with
the immediate switches/nodes in the forwarding table.

Regarding claim 6, Soloway'092 discloses wherein the new route information
improves existing routes and the new route information is used in recalculating routes (see
col. 3, line 13-24 and col. 4, line 19-65; note that the LSP packet with the newly affected
link/route information is received due to the network topology changes (i.e. adding a new
node/switch in the network). The routing/forwarding Logic recalculates/updates the routes in
the forwarding table in accordance with the newly affected links/routes to improve/advance
the current/existing links routing.)

Soloway'092 does not explicitly disclose only a parent node sending the new route
information is used in recalculating of improved routes.

However, the above-mentioned claimed limitations are taught by Elliott'599. In
particular, Elliott'599 teaches only a parent node (see FIG. 2A, neighbor node A) sending the
new route information is used in recalculating of improved routes (see col. 9, line 26 to col.
11, line 20; note that node E receives the cluster beacons (i.e. link-state updates) message
from the neighbors A, B, C, and D. According to the beacon messages, node E detects that
the data/packet in path node E-D-B is encountering large amount of congestions, and
determines that the lesser cost and improve route from node E to node B is by incorporating
neighbor node A into the route recalculation.)

In view of this, having the system of Soloway'092 and then given the teaching of

Elliott'599, it would have been obvious to one having ordinary skill in the art at the time the

invention was made to modify the system of Soloway'092, by providing a mechanism to

incorporate the neighbor node into an improved route re-calculation upon receiving a beacon

message, as taught by Elliott'599. The motivation to combine is to obtain the

advantages/benefits taught by Elliott'599 since Elliott'599 states at col. 1, line 40-64 that such

modification would decrease the number of control traffic, reduce the cost/bandwidth in the

network, and increase the network utilization.

Regarding Claim 8, Soloway'092 discloses wherein the computer network comprises

greater than one hundred nodes (see FIG. 1, switches 4, and see col. 23, line 50-52; note that

the network includes plurality of switches; thus, it is clear that the plurality of switches can

be greater than one hundred nodes).

Regarding Claim 9, Soloway'092 discloses wherein said node has lost its path to

another node within the computer network (see col. 4, line 25-30 and 60-65; note that the

channel failure or a permanent link failure constitutes the losing the link to another switch.)

Regarding Claim 10, Soloway'092 discloses reattaching the node at a location within

a remaining portion of a spanning tree (see FIG. 2, a routing table of switch 4a consists the

Hold-down bit for channel 8a of switch 4d; FIG. 9 step 74-78; col. 3, line 15-41; col. 8, line

12-61; col. 6, line 34-69; note that when LSP/ILSP indicates the affected link, the switch 4a

enters the switch (i.e. switch 4d) associated with the affected links (i.e. hold-down bit entry)

in the forwarding table/tree. Then, the switch (i.e. Switch 4a) re-computes/re-calculates/reattaches the switches associated with the remaining non-affected links/switches in the forwarding table. Note that a spanning tree is the forwarding table, which is build according to Dijkstra's algorithm.)

Regarding Claim 11, Soloway'092 discloses recalculating routes to all other nodes in a subtree of which the node is a root node (see FIG. 2; col. 6, line 34-69; note that when LSP/ILSP indicates the affected link, the switch (i.e. Switch 4a) re-computes/re-calculates the links/routes associated with the switches/end-nodes the in the forwarding table. One of the switches (i.e. Switch 4d) is the origination node.)

Regarding Claim 12, Soloway'092 discloses performing an incremental route recalculation for all nodes within the network that have received new link state information (see col. 3, line 13-24 and col. 4, line 19-65; note that routing/forwarding Logic recalculates/updates the routes in the forwarding table upon receiving LSP packet. Also, see col. 7, line 60 to col. 8, line 33; and col. 20, line 31-61; note that routing and forwarding logics in each switch utilizes Dijkstra's algorithm shortest path calculation to compute/construct each route/link for the forwarding table. When applying Dijkstra's algorithm for shortest paths, the algorithm must utilize the differences/increments/deltas between existing routes and newly affected routes. Thus, each switches utilizes incremental route calculation.)

Regarding Claim 16, Soloway'092 discloses wherein the computer readable medium is selected from the group consisting of CD-ROM, floppy disk, flash memory, system memory, hard drive, and data signal embodied in a carrier wave (see FIG. 4, the combined system of LSP Database 34 and Forwarding Table 36; see col. 9, line 56 to col. 10, line 14; note that the combined system is the "system memory" since it is capable of storing route information.)

Regarding Claim 25, Soloway'092 discloses a root node, and Elliott'599 discloses teaches sorting nodes into the order of nodes and the root node as described above in claim 22. Thus, the combined system sorts nodes in to order of cost from the root node.

In view of this, having the system of Soloway'092 and then given the teaching of Elliott'599, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Soloway'092, as taught by Elliott'599, for the same reason as stated above in claim 22.

Regarding Claim 32, Soloway'092 discloses wherein said at least one the existing routes is made worse (see col. 3, line 13-24 and col. 4, line 19-65; note that the LSP packet with the newly affected link/route information is received due to the network topology changes (i.e. a link is failed, or a set of un-operational channels on the link) and further comprising recalculating routes to all nodes in a subtree of the node (see FIG. 2, List of forwarding channels, hold down bit channel 8a; see col. 8, line 12-60; note that the switch determines/re-evaluates the forwarding table by changing each destination node entry (i.e.

hold down bit on that particular channel of the affected links/routes) after receiving a link

change LSP due to a failure.) Moreover, in case of a link failure, the routes/links to the

source/root node, stored in the forwarding table, are no longer operational; the

routing/forwarding logic must re-evaluate and re-compute the existing routes in accordance

with the affected links/routes. In the process of recovering/improving the routing, first the

logic must cancel the links/routes associated with the affected switches. Then after, the

routing logic must re-evaluate and re-compute all routes/links associated with the immediate

switches/nodes in the forwarding table.)

Regarding Claim 33, the combined system of Soloway'092 and Elliott'599 discloses

wherein recalculating routes to all nodes which have received new link state information and

processing said nodes in the order of distance from a root node (see Soloway'092 col. 7, line

60 to col. 8, line 33; and see col. 20, line 31-61; note that routing and forwarding logics in

each switch utilizes Dijkstra's algorithm shortest path calculation to compute/construct each

route/link for the forwarding table. When applying Dijkstra's algorithm for shortest paths, the

algorithm must utilize the differences/increments/deltas between existing routes and newly

affected routes.) Elliott'599 discloses processing in increasing order of distance from a root

node (see col. 5, lines 34-55; see col. 20-65; see col. 10, lines 35-65; note that the received

route messages are processed starting from the lowest cost (i.e. shortest distance or path)

from the source/root node. Also, when determining the shortest path starting from the lowest

cost or shortest path, one must process in increasing order since the lowest cost or shortest

path has already been defined.)

In view of this, having the system of Soloway'092 and then given the teaching of

Elliott'599, it would have been obvious to one having ordinary skill in the art at the time the

invention was made to modify the system of Soloway'092, as taught by Elliott'599, for the

same reason as stated above in claim 1.

9. Claims 5, 7, 14, 17, 21, 23, 26 and 28 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Soloway'092 in view of well-established teaching in art.

Regarding claims 5, 14, 17, 21, 23 and 28, Soloway'092 discloses all aspects of the

claimed invention set forth in the rejection of Claims 1, 13,16, and 20, and further discloses

wherein recalculating existing routes comprises implementing equal-cost path (see col. 7,

line 60 to col. 8, line 33; and see col. 20, line 31-61; note that routing and forwarding logics

in each switch utilizes Dijkstra's algorithm shortest path calculation when computing/re-

computing or constructing/re-construing routes/links for the forwarding table. It is also note

that when two shortest paths have the same cost, the rout/link is selected based upon the

order of the channel address (i.e. tie-breaker).) Elliott'599 teaches determining cost of each

route as described above in claims 1 and 22.

Soloway'092 does not explicitly disclose implementing equal-cost path splitting or

splitting traffic across more than one path if total cost is the same for each of the paths.

However, the above-mentioned claimed limitations are taught by well-established

teaching in the art of routing and Dijkstra algorithm. Well-established teaching in art teaches

equal-cost path splitting or splitting traffic across more than one path if total cost is the same

for each of the paths. In particular, the tiebreaker rule is implemented for two equal-cost

paths in Soloway'092 teachings. Thus, Soloway'092 must implement and assign equal cost to

two or more routes/links utilizing Dijkstra algorithm. Moreover, according to Dijkstra

algorithm, one can assign and implement equal cost path splitting.

In view of this, having the system of Soloway'092 and then given the well-establish

teaching in the art, it would have been obvious to one having ordinary skill in the art at the

time the invention was made to modify the system of Soloway'092, by providing a

mechanism to assign/implement Dijkstra algorithm's equal-cost path splitting, as taught by

well-establish teaching. The motivation to combine is to obtain the advantages/benefits

taught by well-established teaching in the art such modification would decrease overloading

one particular route/link by implementing and assigning equal cost to path/routes and by

distributing/splitting the traffic load among equal cost links.

Regarding claims 7 and 26, Soloway'092 discloses all aspects of the claimed

invention set forth in the rejection of Claims 1, and further discloses wherein the new route

information worsens existing routes and a parent node sending the information is no longer

considered a parent node by said node (see FIG. 2, List of forwarding channels, hold down

bit channel 8a; see col. 8, line 12-60; note that the switch determines/re-evaluates the

forwarding table by changing and excluding each destination node entry associated with the

affected links/routes (i.e. hold down bit on that particular channel of the affected links/routes)

after receiving a link change LSP due to a failure. Also, the patent node, a sender node, (i.e.

FIG. 1, Switch 4c) sending the LSP packet due to a failure is excluded from the destination

node entry in the forwarding table by hold down bits.

10. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Soloway'092 and

Elliott'599 as applied to claim 1 above, and further in view of Spiegel (U.S. 5,649,108).

      Regarding claim 29, the combined system of Soloway'092 and Elliott'599 discloses

all aspects of the claimed invention set forth in the rejection of Claim 1 as described above.

Soloway'092 further teaches each node within the computer network is represented by a data

structure (see FIG. 4, a combined system of LSP database 34 and forwarding table 36; see

col. see col. 9, lines 56 to col. 10, lines 12) comprising information about links to other nodes

(see FIG. 2, list of forwarding channels for the destination switch 4b-d and end nodes; see

col. 8, lines 8, lines 45 to col. 9, lines 49) and cost of the link (see col. 14, lines 56 to col. 15,

lines 24);

      Neither Soloway'092 nor Elliott'599 explicitly discloses cumulative cost of all links

traversed from root to the node.

      However, the above-mentioned claimed limitations are taught by Spiegel'108. In

particular, Spiegel'108 teaches wherein each node (see FIG. 6A, Node A) is represented by a

data structure (see FIG. 6A, Routing Table) comprising the information about the links to

other nodes (see FIG. 6A, Source route column) and cumulative cost of all links traversed

from root (see FIG. 6A, destination address column) to the node (see FIG. 6A, total

accumulative cost for each destination; see col. 10, line 11-50).

      In view of this, having the combined system of Soloway'092 and Elliott'599, then

given the teaching of Spiegel'108, it would have been obvious to one having ordinary skill in

the art at the time the invention was made to modify the combined system of Soloway'092

and Elliott'599, by providing the cumulative cost in the routing table, as taught by

Spiegel'108. The motivation to combine is to obtain the advantages/benefits taught by

Spiegel'108 since Spiegel'108 states at col. 2, line 24-35 that such modification would

provide the best alternative paths by utilizing routing control which combine the benefits of

progressive protocol and originating routing protocol.

Allowable Subject Matter

11. Claim 31 is objected to as being dependent upon a rejected base claim, but would be

allowable if rewritten in independent form including all of the limitations of the base claim

and any intervening claims.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this

Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this

final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ian N Moore whose telephone number is 571-272-3085. The examiner can normally be reached on M-F: 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on 571-272-3078. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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BRIAN NGUYEN
PRIMARY EXAMINER